

Book Reviews

HUMAN BIOLOGY IN PAPUA NEW GUINEA: THE SMALL COSMOS. Edited by Robert D. Attenborough and Michael P. Alpers. 1993. New York: Oxford University Press. 427 pp. ISBN 0-19-857514-9. \$105.00 (cloth).

PEOPLE OF THE GREAT OCEAN: ASPECTS OF HUMAN BIOLOGY OF THE EARLY PACIFIC. By Philip Houghton. 1996. New York: Cambridge University Press. 292 pp. ISBN 0-521-47166-4. \$64.95 (cloth).

Recent studies in human genetics, biology, archaeology, and historical linguistics have converged to sharpen our understanding of the peopling of Oceania and the interplay of population migrations, the agents of disease and selection, and the ubiquity of change there. Together, they represent a remarkable exercise of the joint power of what one might venture to call a "synthetic" anthropology.

The 1993 collection of articles in *Human Biology in Papua New Guinea: The Small Cosmos* (edited by Robert Attenborough and Michael Alpers) offered an excellent summary of human biology and important related materials from linguistics, social anthropology, and archaeology in that area (it was in part a sequel to the volume edited by Hill and Serjeantsen in the same Oxford Press Series). The region that includes New Guinea and Island Melanesia has been synonymous with unexplained variability and complexity in both ecology and human biology, contrasting with the uniformity found in the widely dispersed islands in the Central and Eastern Pacific. As the editors say, "within this small cosmos (of Papua New Guinea) may be displayed, in microcosm, the mechanisms and forces which have influenced the past migration of human beings into new environments and the creation of distinct cultures and languages: the dynamics of small, semi-isolated genetic pools responding to the challenges of disease, geog-

raphy, and competing human groups; and the responses of these groups to the contemporary challenges of modernization" (p. 2).

Among the volume's themes that are relevant to understanding the causes of the population variability of the region are the following: 1) Present-day Austronesian-speaking populations, primarily scattered along the north coast of New Guinea and more ubiquitous elsewhere in the Pacific, are descended primarily from an earlier maritime population that is distinct genetically from non-Austronesian ancestral populations already residing in the region. 2) The other groups there (referred to as "Papuan" or "non-Austronesian"), by contrast, are so highly variable that they cannot be considered as a related group in any respect—neither in language, history, or biology. To paraphrase Foley, it is impossible to reconstruct an ancestral language for these non-Austronesian languages, because there are at least 40 identifiably distinct language families. Serjeantson et al. propose three identifiable founding groups there that predate the Austronesian arrival (and I would suggest more). 3) The variability of the non-Austronesians is the result of their long occupation of the region in very small, fragmented, and rather sedentary groups that are highly susceptible to genetic drift. 4) The Austronesians intermixed with local populations to varying degrees. To quote Kirk, "it would be foolish . . . to believe that [early Austronesian] distinctiveness will have remained clear-cut in all present-day populations" (p. 193). Thus, today, within local regions, geographic proximity most often becomes the major predictor of biological and genetic similarity, because even small rates of intermarriage will have major effects over a few millennia. 5) Although some relatively uniform conditions must have prevailed over the region for most of the time (e.g., severe disease loads, uncertain food supplies and lack of nutritious weaning foods, high infant mortality rates, and heavy physical work loads), major changes and

population movements clearly occurred periodically during the precolonization period. In the words of Alpers and Attenborough, "precise correspondences between recent conditions and those in the past cannot be drawn, nor stability too strongly assumed" (p. 5). There was no precontact equilibrium condition. 6) The only identifiable hereditary distinctions among populations that can be tied to ecological and epidemiological variation across New Guinea are the distributions of malarial-associated polymorphisms. For example, Lourie concludes that, in spite of the long-term ecological distinctions, with the possible exception of lung volume and ventilatory capacity, "the evidence is not in favor of a genetic basis for the observed variations in physiological responses" (p. 278). (This contrasts with Houghton's arguments for Polynesians over a short time interval, as will be discussed below.)

More recent books by Spriggs (1997) and Kirch (1997) and the edited volume by Bellwood et al. (1996) expand the prehistoric and linguistic dimensions from South China to the edge of the eastern Pacific islands. They deal primarily with the nature and reality of an Austronesian diaspora—the people, their languages, and the cultural distinctiveness of those groups that moved out into the Pacific beyond New Guinea, becoming the first human colonists of "Remote Oceania," the islands beyond the central Solomons chain. Their basic argument has the following outline: The rise of intensive rice domestication in the Yangzi Valley approximately five millennia ago set off a chain of demographic expansions comparable to those in southwest Asia, Mesoamerica, and elsewhere. Peoples with a complex of distinctive cultural innovations, speaking Austronesian languages, spread throughout Island Southeast Asia (contemporary Taiwan, the Philippines, Indonesia, etc.). From there, some moved eastward to the New Britain/New Ireland region of Island Melanesia, as evidenced in their linguistic similarities (Oceanic languages of Austronesian), archaeological horizons (Lapita pottery and associated cultural complex), and genetic markers (particularly the

mtDNA 9 bp deletion discussed by Hertzberg, Stoneking, and others). Spriggs painstakingly documents the distinctiveness of Austronesian/Lapita settlement from anything that had previously existed in the region. Kirch elaborates on the evolution of the Lapita culture and peoples in their remarkable spread across the Pacific as the precursors of the Polynesians. They specifically and convincingly debunk the contrary scenario of a gradual emergence of Austronesians out of Island Melanesia, although this position is still supported by a number of archaeologists, notably John Terrell and J.P. White.

Philip Houghton's book, *The People of the Great Ocean: Aspects of Human Biology in the Early Pacific*, comes from a very different perspective and argues that some physical and physiological distinctions have recently evolved through intense selection in Pacific populations beyond New Guinea. This is an extended essay on how the Polynesians in particular came to have their especially robust physique. Houghton's adaptationist argument can be presented as a syllogism: 1) The Polynesians are one of the largest and most muscular human populations. 2) This (along with distinctive features of their crania and physiology) represents their successful adaptation to the intense selection incurred by their exposure to cold in their Neolithic sailing vessels in the Pacific. 3) These adaptations necessarily required many generations to effect, whereas the settlement of the central and eastern Pacific (Polynesia) occurred only over the past two millennia. 4) There are no large-bodied peoples in Southeast Asia or Island Southeast Asia, Austronesian or otherwise, but there are a few relatively large groups in Island Melanesia (e.g., the Ontong Javanese, Lau, and Ulawa of the Solomon Islands). 5) Because the Polynesians cannot be descended directly from small Southeast Asian populations in so short a time, they must be descended mainly from some already relatively large-bodied groups similar to these populations of Island Melanesia. Consistent with this argument, there is a gradual increase in the contemporary distri-

bution of body mass and muscularity across populations in this region.

Houghton's argument weaves through some complex materials in human anatomy (particularly osteology) and body composition, reviewing materials in genetics and archaeology as well. His writing style is engaging and makes his thesis easy to follow. He not only covers a very large body of relevant work (his and many others), he also reanalyzes a comprehensive body of data to support his position on the relationships of morphology and climate in Oceanic populations, present and past.

His contention that these Pacific sailors were subject to cold microenvironments more severe than those of the Inuit rings true enough. I have found myself shivering and numb in the Pacific wind and rain, even when the water temperature was over 25°C. Houghton quotes Captain Bligh in his open boat in the same region to the same effect: "At noon it was almost calm, no sun to be seen, and some of us shivering with cold" (p. 62). He dismisses fat as a critical component in his adaptationist argument, at least for men; although modern Polynesians on Westernized diets have a marked tendency toward obesity, he argues that early observations suggested that only the highest social classes were especially fat. This tendency was an indirect consequence of selection for increased muscle mass as an adaptation to cold, resulting partly from muscle's insulating properties but, more importantly, as a heat-generating tissue through increased basal metabolism, shivering, and work. His tables modelling predicted heat lost at different temperatures, sheltered and unsheltered from the wind, wet and dry, for different (average Oceanic) population physiques are particularly interesting. He concludes that apparently trivial differences in metabolism or total insulation can have disastrous (i.e., intense selective) consequences, favoring larger-bodied, particularly heavily muscled individuals with consequently higher basal metabolic rates, oxygen consumption, and respiratory rates along with larger airways and altered cranial anatomy.

A general problem with Houghton's argument is that, perhaps to make his argument

on body mass plausible, he dismisses the emerging consensus that I have described on the recent primary origins of Polynesians among Southeast Asian populations. If his basic hypothesis seems attractive on its face, then, in the end, I am not convinced of its validity for two major reasons. First, his adaptationist argument is inconsistent internally and remains empirically untested. For example, if Houghton is correct about the extent of differential mortality on these open-ocean voyages, then the pressures would almost certainly have been most intense on the few (smaller-bodied) women making these trips, and the muscle mass distinctions that he stresses would not be so substantial or important among them as among males. More important, Houghton has not shown that the anatomical distinctions he stresses have greater functional (i.e., survival) value. To be persuasive, he would have to conduct comparative cold stress tests as well as measure basal metabolic and vital capacity distinctions on living Polynesians and their relatives. He relies instead on physiological data, which I believe are based primarily on young males' responses. However, the recent literature in cold-response physiology emphasizes major influences on individual variation from acclimatization, habituation, diet, and hormone levels as well as from age and sex (with females showing a different thermoregulatory response, one placing a greater premium on insulative capacity). Houghton down plays this variability in cold response, presuming substantial uniformity within broad population categories. Certainly, his argument does not meet the requirements of proof that experts in the field of adaptation have delineated (cf. Brandon 1991, *inter alia*).

The second reason for my skepticism is that Houghton's "evidence" rests heavily on correlations of body morphology with climatological or ecological variables in the Pacific and, hence, is susceptible to tautology and false cause-and-effect scenarios, as with classic explanations for skin color variation. As noted, he finds justification for his argument in the gradations of Pacific populations (moving east from Asia) in those aspects of body

morphology that he associates with adaptation to cold—larger body mass, particularly muscle mass, in relation to surface area. The problem is that any gradations across this region are much more likely to result from different human migrations, not from long-term selection differentials. Specifically, he rejects the idea that the Austronesian language distribution in the Pacific has much relevance for human biological differences or for historical migration patterns, and he explicitly criticizes the Harvard Solomon Islands Expedition for its “unsuccessful attempts to discern a fundamental biological dichotomy matching a putative linguistic dichotomy” (p. 100). That study, with which I was intimately involved, showed very clearly that Austronesians across the Pacific tended to “hang together” biologically and that the non-Austronesian-speaking populations were, by contrast, very heterogeneous—consistent with their long-time occupation in place. Like the Papua New Guinea studies covered in the Attenborough and Alpers volume, the pattern in the Solomons was certainly not dichotomous but was consistent with a recent wave of migration across the region by relatively homogeneous (Austronesian-speaking) peoples. It is exactly those Austronesians, who are known to be either back-migrants from Polynesia or to have had little contact with peoples from the island interiors, whom Houghton cites as his transitional, large-bodied groups in Island Melanesia (the Ontong Java group, the Lau of Malaita, and the Ulawans). In fact, his body-size data are consistent with a very

clear distinction separating less intermixed Austronesian populations in this region from other, smaller, peoples.

There are other problematic issues in these correlations. Given Houghton's hypothesis, one might expect to find the most extreme (largest) Polynesians on the periphery—in Hawaii, Easter Island, and New Zealand—where the number of voyaging interludes, distances, and temperature extremes were the greatest, versus Samoa and populations of the Central Pacific. This is not the case. The Micronesians also present a contradiction. According to his argument, one might expect the Carolinian atoll seafarers to be as big or bigger than the Polynesians or at least larger than their more sedentary high island relatives. Neither is true.

Taken together, these books and associated articles in anthropological genetics can offer the basis for a very lively seminar in human biology and Pacific anthropology.

JONATHAN S. FRIEDLAENDER
Anthropology Department
Temple University
Philadelphia, Pennsylvania

LITERATURE CITED

- Bellwood P, Tryon D, and Fox J (eds) (1996) *The Austronesians*. Canberra: Pacific School of Research Publications.
 Brandon R (1991) *Adaptation and Evolution*. Princeton: Princeton University Press.
 Kirch PV (1997) *The Lapita Peoples*. Cambridge, MA: Blackwell Publishers.
 Spriggs M (1997) *The Island Melanesians*. Cambridge, MA: Blackwell Publishers.

BOOKS RECEIVED

- Adams V (1998) *Doctors for Democracy: Health Professionals in the Nepal Revolution*. New York: Cambridge University Press. 251 pp. \$64.95 (cloth).
 Barton CM, and GA Clark (eds.) (1997) *Rediscovering Darwin: Evolutionary Theory and Archeological Explanation*. Arlington, Virginia: Archeological Papers of

- the American Anthropological Association. 322 pp. \$27.50 (paper).
 Beard KC, and MR Dawson (eds.) (1998) *Dawn of the Age of Mammals in Asia*. Pittsburgh: Bulletin of Carnegie Museum of Natural History. 348 pp. \$58.95 (paper).
 Bradbury JW, and SL Vehrencamp (1998) *Principles of Animal Communication*. Sunderland, Massachusetts: Sinauer Associates. 882 pp. \$62.95 (cloth).

- Davis LJ (ed.) (1997) *The Disability Studies Reader*. New York: Routledge. 454 pp. \$24.99 (paper).
- Early JD, and TN Headland (1998) *Population Dynamics of a Philippine Rain Forest People: The San Ildefonso Agta*. Gainesville, Florida: University Press of Florida. 208 pp. \$39.95 (cloth).
- Kim EH, and C Choi (eds.) (1998) *Dangerous Women: Gender and Korean Nationalism*. New York: Routledge. 322 pp. \$22.95 (paper).
- Larsen CS (1997) *Bioarcheology: Interpreting Behavior from the Human Skeleton*. New York: Cambridge University Press. 461 pp. \$85.00 (paper).
- Lynch M, and B Walsh (1998) *Genetics and Analysis of Quantitative Traits*. Sunderland, Massachusetts: Sinauer Associates. 980 pp. \$64.95 (cloth).
- Vogel S (1998) *Cats' Paws and Catapults: Mechanical Worlds of Nature and People*. New York: WW Norton. 382 pp. \$27.50 (cloth).